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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/825,185	04/16/2004	Jack E. Howard	839-1540	8301

30024 7590 06/13/2006

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EXAMINER	
TERESINSKI, JOHN	
ART UNIT	**PAPER NUMBER**
2858	

DATE MAILED: 06/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/825,185	HOWARD ET AL.	
	Examiner	Art Unit	
	John Teresinski	2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 April 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-40* is/are pending in the application.

4a) Of the above claim(s) *18-23* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17 and 24-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Claims 18-23 remain withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on December 22, 2005.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-3, 5, 6, 10-14, 24-29, 31, 33, 34, 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Publication No. 2002/0070729 to Muller in view of U.S. Patent No. 4058,765 to Richardson et al..

Regarding claims 1 and 28, Muller discloses an electronic proximity switch method and device including:

positioning said capacitive sensor proximate to the surface such that the displacement is a distance of a gap between the surface and one of the plates (paragraphs 1, 38-39, Fig. 5 elements 3, 4) ;

applying a high frequency signal to the plates (paragraph 24, Fig. 5 elements 2-4);

applying the high frequency signal and a signal from a sensor plate of the conductive plates to a differential amplifier in the circuit, said signal from the sensor plate being indicative of the displacement between the sensor and the surface (Fig. 5);

differentiating an output of the amplifier and the high frequency signal (paragraph 42, Fig. 5 element 24), and

determining a value of the displacement/a value of the property of the medium based on the difference between the output of the amplifier and the high frequency signal (ie. capacitively determining the approach of a trigger/displacement to activate a proximity switch see paragraphs 39-44). Muller does not explicitly teach determining a magnitude of the displacement or controlling the gain of the amplifier.

Richardson et al. disclose a general displacement sensor including positioning a capacitive sensor proximate to the surface such that the displacement is a distance of a gap between the surface and one of the plates (column 3 lines 12-45), applying a sequence of pulses and a signal from a sensor plate of the conductive plates to inputs of a differential amplifier in the circuit (column 3 lines 13-20, 45-60, Fig. 1 elements 13 and 15), the signal from the sensor plate being indicative of the displacement between the sensor and the surface (column 3 lines 32-45) and determining a magnitude of the displacement based on a difference between the output of the amplifier and the high frequency signal (column 4 lines 11-25). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include determining a magnitude of the displacement from the capacitance sensed as taught by Richardson et al. into Muller for the purpose of a sensing method and apparatus providing

measurement results with increased detail to more effectively characterize the dielectric region under test.

Regarding controlling the gain of the differential amplifier, Richardson et al. further disclose a variable resistor that may be adjusted to increase or decrease the differential gain of the circuit to a desired value (column 6 lines 66-68). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include control the gain of the differential amplifier as taught by Richardson et al. into Muller for the purpose of increasing sensed signal strength.

Regarding claims 2 and 33, Muller discloses sensing a difference between a peak of the output of the amplifier and a peak of the high frequency signal (paragraph 40-44).

Regarding claims 3 and 34, Muller discloses applying the signal from the sensor plate and the high frequency signal as inputs to an operational amplifier (Fig. 5 elements 2-4, 21 and 22).

Regarding claims 5 and 36, Muller does not disclose linearizing the difference between the output of the amplifier and the high frequency signal. Richardson et al. discloses linearizing the difference between the output of the amplifier and the high frequency signal (column 5 lines 20-21). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include linnearizing the results as taught by Richardson et al. into Muller for the purpose of providing a relationship between capacitive measurements and displacement width.

Regarding claims 6, 14 and 37, Muller discloses applying the signal from the sensor plate and the high frequency signal as inputs to an operational amplifier, and wherein differentiating

further comprises applying an output of the operational amplifier and the high frequency signal as inputs to a difference amplifier which generates a cyclical difference signal indicative of the gap, and applying the cyclical difference signal to a peak detector which generates a signal indicative of a peak value of the cyclical signal, and wherein said peak value is indicative of the gap (paragraphs 40-43, Fig. 5).

Regarding claims 10 and 24, Muller discloses positioning the capacitive sensor proximate to the medium, such that the medium is capacitively coupled to the sensor plate (paragraphs 1, 38-39, Fig. 5 elements 3, 4);

applying a high frequency signal to the sensor plate and to the active shield plate, wherein the medium affects a response of the sensor plate to the high frequency signal (paragraph 24, Fig. 5 elements 2-4);

applying a signal induced on the sensor circuit by the high frequency signal and the sensor plate to control a voltage gain of an amplifier in the circuit, said applied sensor signal being indicative of the medium (Fig. 5);

differentiating the output of the amplifier and the high frequency signal (paragraph 42, Fig. 5 element 24), and

determining a value indicative of the medium based on the difference between the applied signal and the high frequency signal (ie. determining the approach of a trigger to activate the proximity switch see paragraphs 39-44).

Muller does not explicitly teach determining a magnitude indicative of a width of a medium.

Richardson et al. disclose a general displacement sensor including positioning a capacitive sensor proximate to the surface such that the displacement is a distance of a gap between the surface and one of the plates (column 3 lines 12-45), applying a sequence of pulses and a signal from a sensor plate of the conductive plates to inputs of a differential amplifier in the circuit (column 3 lines 13-20, 45-60, Fig. 1 elements 13 and 15), the signal from the sensor plate being indicative of the displacement/width between the sensor and the surface (column 3 lines 32-45) and determining a magnitude of the displacement based on a difference between the output of the amplifier and the high frequency signal (column 4 lines 11-25). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include determining a magnitude of the displacement from the capacitance sensed as taught by Richardson et al. into Muller for the purpose of a sensing method and apparatus providing measurement results with increased detail to more effectively characterize the dielectric region under test.

Regarding claims 11, 12 and 25 and 26, Muller discloses the medium is a gap between the sensor plate and a surface, and the value is a distance across the gap (ie. capacitive proximity switch see paragraphs 39 and 40).

Regarding claims 13, 27, 29 and 31, Muller does not disclose a fluid medium. Richardson et al. disclose the medium is a fluid and the value is indicative of a dielectric/impurities of the fluid (column 3 lines 23-25). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the capacitive sensor with a fluid medium as taught by Richardson et al. into Muller for the purpose measuring fluid displacement in a fluid container.

Claims 4, 7-9, 15-17, 30, 32, 35 and 38-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muller and Richardson et al. as applied to claims 1, 10, 24 and 28 above and further in view of U.S. Patent No. 6,307,385 to Tardif et al..

Regarding claims 4 and 35, Muller as modified does not disclose applying the output of the amplifier as feedback to the signal from the sensor plate. Tardif et al. discloses a method and device for measuring capacitance of a capacitive sensor having a differential amplifier (Fig. 3, element 13) receiving input from a sensor/capacitive plate (1) and the amplifier applying the output of the amplifier as feedback to the signal from the sensor plate (Fig. 3, see element 13 with feed back loop). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include applying the output of the amplifier as feedback to the signal from the sensor plate as taught by Tardif et al. into Muller as modified for the purpose of improving overall stability of the measurement circuitry.

Regarding claims 7, 8, 15, 16, 38 and 39, Muller discloses the sensor plate, an active shield plate, wherein said high frequency signal is applied to the sensor plate and to the active shield plate (Fig. 5 elements 2-4). Muller as modified does not disclose a passive shield plate and further comprises connecting the passive shield plate to a ground via a resistive connection/cable and grounding the passive shield plate and coupling the passive shield plate to the high frequency signal via a resistive conductive path. Tardif et al. discloses a passive shield plate (6), wherein said passive shield plate is insulated from the active shield plate (4) and the

sensor plate (1), and said method further comprises connecting the passive shield plate to a ground via a resistive connection/cable and grounding the passive shield plate and coupling the passive shield plate to the high frequency signal via a resistive conductive path (Fig. 3, passive shield plate 6 is capacitively coupled to sensor plate1, which is coupled to the voltage source through a resistance). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a passive shield plate as taught by Tardif et al. into Muller as modified for the purpose of reducing the effects of external objects.

Regarding claims 9, 17 and 40, Muller discloses monitoring the high frequency signal for a direct current (dc) signal induced by the coupling of the passive shield plate and, when a dc signal is detected, inhibiting the determination of the value of the displacement (ie. filtering extraneous peaks, paragraph 9).

Regarding claims 30 and 32, Muller does not disclose a solid medium. Tardif et al. discloses the medium is solid and the value is indicative of a dielectric/impurities of the material (ie. moisture level in wood, see column 3 lines 23-40). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the capacitive sensor with a solid medium as taught by Tardif et al. into Muller for the purpose of more accurately evaluating moving parts in a machine environment.

Response to Arguments

Applicant's arguments with respect to claims 1-17 and 24-40 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Teresinski whose telephone number is (571) 272-2235. The examiner can normally be reached on M-F 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diane Lee can be reached on (571) 272-2399. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JT
June 6, 2006

ANJAN DEB
PRIMARY EXAMINER